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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/540,552
Filing Date: August 02, 2005
Appellant(s): MIZOTA, YASUO

Steven M. Gruskin
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed October 15, 2008 appealing from the Office action mailed May 15, 2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.[1]

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 6,461,459	Ogawa et al.	10-2002

[1] As correctly noted by appellant in the "Status of Claims" section of the brief, the previous rejection of claims 1-6 over Ohkubo (US 2003/0024627) was withdrawn by the examiner in the Advisory Action of July 28, 2008.

US 6,702,913	Marchini et al.	3-2004
US 2002/0046796	Hitotsuyanagi et al.	4-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-6 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa et al. (US 6,461,459; hereafter "Ogawa") taken in view of Marchini et al. (US 6,702,913; hereafter "Marchini") and Hitotsuyanagi et al. (US 2002/0046796; hereafter "Hitotsuyanagi").

Ogawa discloses a method (and corresponding apparatus) of making a tire structural member (belt or carcass) by successively and contiguously attaching strips to a convex outer surface cross section of a forming drum (note col. 5, lines 20-29 and esp. lines 25-29 indicating that the core/drum can have a "crowned" and thus convex outer surface) by a strip feed device (15/17/22/25) such that the strips extend obliquely to a center axis of the forming drum (e.g. fig. 7), the method including continuously attaching the strips to the convex outer surface of the forming drum by successively feeding strips onto the convex outer surface by the strip feed device (15/17/22/25), while the strip feed device is being moved parallel to the center axis of the forming drum relative to the forming drum and while the forming drum is being rotated about the center axis thereof (e.g. col. 9, lines 1-9). Further, Ogawa suggests achieving the desired inclination angle of the strips by controlling the rotation of the forming drum/core and the lateral displacement speed relative to each other. In particular, Ogawa suggests that

> "the inclination angle α formed between the equatorial line of the core 2 and the reinforcing element 37 can be appropriately selected by adjusting the rotational speed of the core 2 and the lateral displacement speed of the crosshead 25 relative to each other." (col. 9, lines 10-14).

Ogawa thus teaches a method/apparatus as claimed except specific control of the rotation of the drum from minimum to maximum to minimum velocities relative to a fixed lateral movement speed as claimed is not suggested.

Marchini is also directed to forming a tire reinforcement structure such as a belt by successively applying strips on a convex support/drum and in particular teaches that unless appropriate steps are taken, the curvature of the drum makes is impossible to optimally apply the strips (i.e. with the strip edges adjoining one another along their entire lateral extent), this reference teaching instead to progressively apply the strips in a manner that the angle relative to the midplane gradually increases towards the axial extremities of the strips (esp. fig. 5 and col. 8, line 28-col. 11, line 35). More particularly, Marchini suggests that because of the constant width of each strip and the convex profile of the support,

> "[i]t would consequently be impossible to make each longitudinal edge of each segment 5 match with the longitudinal edge of the adjacent segment 5, according to the entire longitudinal extension of the edges themselves. If the edges of the segments 5 were made to match in correspondence with the equatorial plane, a partial superposition of the segments themselves would be determined, progressively larger in the direction of the opposite extremities of each of them. If, vice versa, the angular rotation pitch of the toroidal support 3 were regulated in such a way as to make the extremities of the segments 5 match, an empty space S would be obtained between contiguous segments in correspondence with the equatorial plane, as is clearly shown in schematic fashion in FIG. 6, which represents the laying obtainable, in the circumstances specified above, according to the teachings of the prior art. In this figure, the empty space S has been purposely enlarged, for the sake of better representational clarity." (col. 9, line 58 - col. 10, line 8).

In other words, Marchini explains the geometric reality that for a crowned drum, *the length of the circumference at the equatorial plane will be longer than the length of the circumference at the lateral edges*. Because the strips are of a constant width but the crowned drum has these different circumferential lengths, if the strips are applied at a constant angle, *it is geometrically impossible for the strips to advantageously adjoin one another at both the equatorial plane and the lateral edges* (e.g. note col. 9, line 15 - col. 10, line 8). Marchini therefore suggests that this geometric problem can be solved by applying the strips in a manner that the strip angle relative to the midplane gradually increases towards the axial extremities of the strips (esp. fig. 5).

Note that this is essentially the same problem being addressed by the present invention (e.g. note appellant's summary of the invention in the Brief as well as the last two lines on page 2 to the end of the second full paragraph on page 3 of appellant's specification). Again, to solve this problem, Marchini suggests applying the strips with a varying angle across the width, the angle gradually increasing from the midplane towards each axial extremity (fig. 5), the particular angles selected based upon the geometric and the dimensional characteristics of the convex support and the strips to be laid thereon (esp. col. 10, line 45 - col. 11, line 18).

In view of this teaching and the fact that Ogawa, as noted above, suggests achieving/adjusting the desired inclination angle of the strips by controlling the rotation of the forming drum/core and the lateral displacement speed relative to each other (col. 9, lines 10-14), it would have been obvious to control these speeds relative to one another to yield the desired angle variation taught to be advantageous by Marchini,

especially when applying to crowned drums. In other words, at issue is simply, *in view of the teachings of Marchini, what angle would be selected by the ordinary artisan in practicing the Ogawa invention for application of strips to a convex drum surface?* Marchini clearly suggests what this angle should be when the cord strips are to be applied to a convex or crowned drum - namely a gradually larger angle towards the lateral edges to advantageously allow the strip edges to adjoin one another evenly along their entire lateral extent. Appropriate adjustments of the relative speeds needed to achieve this would have been readily apparent from the Ogawa teachings.

While Marchini chose a different specific application method to actually achieve the desired strip path (including pressing initially at the center, rotation around a center axis, etc.), Marchini identified the fundamental problem created by the fundamental geometric realities accompanying applying constant width belt strips on a crowned drum, as well as the fundamental solution to this problem (varied angular path as in fig. 5). Such a solution would have been certainly understood as applicable to any process in which a belt reinforcement is formed by successively applying belt strips to a crowned drum, such as in Ogawa. In other words, the problem identified by Marchini, as well as the solution to this problem, would have been understood as applicable to any process in which a tire belt is formed by successive application of strips to a crowned drum, regardless of the particulars of the specific application process of the strips.

As to leaving the axial speed fixed and only adjusting the drum angular velocity, Hitotsuyanagi (like Ogawa) is also directed to successively applying rubberized cord material to a drum using an axially traversing feeder and rotatable drum so as to have a

non-linear path and in particular evidences an understanding that a suitable and effective manner to achieve the varying angles (and especially a larger angle at the edges relative to the center) is to control only the speed of the drum during the traverse of the feed device with the maximum speed being at the center and reduced speeds at the edges - note esp. paragraphs [0125]-[0131] and fig. 11 of Hitotsuyanagi. To control the drum rotation during the traverse of the feed device in Ogawa so as to be at a maximum at the center and smaller towards the edges to achieve the desirable cord path suggested by Marchini would therefore have been one obvious manner of operation of the Ogawa process to achieve the desirable angle variation and would predictably be expected to achieve the desirable angular path. In other words, Hitotsuyanagi provides evidence that, in this art, in the context of processes that include successively applying rubberized cord material to a drum along a non-linear path and that use an axially traversing feeder and rotatable drum, it is understood to be suitable and effective to achieve the varying angles by controlling *only the speed of the drum during the traverse of the feed device*. In other words, Hitotsuyanagi et al. teaches the artisan that it is suitable and sufficient, in a similar process/apparatus to Ogawa, to achieve a desired path by only controlling the drum rotation speed. To control the drum rotation during the traverse of the feed device in Ogawa et al. so as to be at a maximum at the center and smaller towards the edges to achieve the desirable cord path suggested by Marchini et al. on a crowned drum would therefore have been obvious and predictably expected to achieve the homogeneous distribution attributed to this desirable angular path.

A method and corresponding apparatus (including the controller controlling the speeds in this manner) as required by claims 1 and 4 would therefore have been obvious.

As to claims 2 and 5, Marchini teaches achieving the same final resultant cord path as appellant (i.e. both desire that the strips have edges that adjoin along their entire length) and further specifically teaches that the actual path selected is computed based upon "the geometric and dimensional characteristics of the toroidal support 3 and of the strip-like segments 5 laid thereon" (col. 10, lines 45-50), specific mention being made of the axial dimension of the belt, the curvature and radius of the core and the number of strips to be applied (col. 10, line 55 - col. 11, line 18). Taking this teaching coupled with the processing of Ogawa/Hitotsuyanagi, which suggests achieving the desired inclination angle of the strips by controlling the rotation of the forming drum/core (col. 9, lines 10-14), controlling rotation of the drum following the claimed formula is the obvious and necessary geometric relationship that would have to be followed by the artisan to achieve the adjoining strip edges along their entire length.

As to claims 3 and 6, Marchini also suggests effecting the cutting so that the oblique ends end up circumferentially oriented (esp. col. 11, lines 19-30), the claimed angle being the necessary and obvious geometric manifestation of this teaching.

(10) Response to Argument

The summary presented at pages 11-12 of appellant's brief of arguments previously made by appellant, and the examiner's response thereto, are noted and require no further response. With respect to the newly presented arguments, appellant

first argues that a person having ordinary skill in the art would not combine the references as suggested by the examiner. In particular, it is argued that Ogawa does not teach the specific control of the drum rotation from minimum to maximum as claimed. While this is not disputed, Ogawa again specifically suggests selecting the desired inclination angle by adjusting the rotational speed of the forming drum/core and the lateral displacement speed relative to each other (col. 9, lines 10-14). Thus, while it does not specifically suggest control of the speeds as claimed, it is also not inconsistent with such control.

With respect to Marchini, it is argued that

> "[c]onversely, Marchini teaches that applying the strips from one axial end of the tire to the other axial end of the tire (as is taught in Ogawa), while rotating the tire about its rotational axis, can cause gaps to be formed between adjacent strips resulting in non-homogeneity in the reinforcing structure. See Col. 2 line 66-Col. 3, line 2. In other words, Marchini teaches that the process described in Ogawa is disadvantageous due to the above described problems. Therefore, Marchini instead teaches that to guarantee perfect structural homogeneity in the reinforcing structure there must be a relative rotation brought about between the toroidal support and the reinforcing strip, about the axis of correction Y-Y (which is shown in Figs. 3 and 4 to correspond not with the rotational axis of the tire, but the radial axis of the tire). See Col. 3, lines 3-17. In other words, Marchini teaches that to generate homogeneity in the reinforcing structure, the reinforcing strip must be rotated about the radial axis of the toroidal support. Marchini also teaches that strips should be applied from the center of the tire's width outward to the axial ends and not from one axial end to the other axial end if non-homogeneity is to be avoided.

It is also argued that "Marchini teaches that the method used in Ogawa is flawed and must be replaced with the entirely different method taught in Marchini" and thus the artisan would adopt the Marchini process rather than apply the Marchini teachings to the Ogawa process.

These arguments however are considered to extrapolate too much from the language at col. 2, line 66 to col. 3, line 2 of Marchini. First, contrary to this argument, there is no indication that Marchini is explicitly or even implicitly specifically referencing a formation method as taught by Ogawa. Rather, this simply indicates that if strips are applied at a single predetermined angle on a convex drum, then the reinforcing structure is not in perfect structural homogeneity. More specifically, Marchini identifies (esp. col. 9, line 58 - col. 10, line 8) the *fundamental geometric realities* facing the ordinary artisan in forming a belt reinforcement structure using successively applied strips on a crowned drum (namely that their edges cannot line up along their length unless they are applied with varying angles), *regardless of how these strips are applied.* In other words, it would have been readily apparent that these geometric realities apply to any process where strips are successively applied to a convex drum and that the solution thereof, namely applying the strips with varying angles across their width (fig. 5 of Marchini), would be suitable and effective regardless of how these varying angles are achieved. Thus, while it is not disputed that Marchini chose a different *specific* strip application methodology from that claimed or that of Ogawa, Ogawa and Marchini are fundamentally both directed to formation of a tire belt from successively applied strips. These teachings would therefore have been seen by the ordinary artisan as instructive and important when practicing the Ogawa process on a crowned drum (note again col. 5, lines 25-29 of Ogawa indicating that the core/drum can have a crowned outer surface).

In particular, Marchini et al. indicates that it is desirable for the belt to be homogeneous, this being achieved by having the belt strips have edges that adjoin one another along their entire longitudinal extension (e.g. col. 9, lines 58+). Marchini then indicates that when applying the strips on a crowned drum, the curvature of the drum makes is impossible to optimally apply the strips. More specifically, Marchini explains the geometric reality that for a crowned drum, *the length of the circumference at the equatorial plane will be longer than the length of the circumference at the lateral edges.* Because the strips are of a constant width but the drum has these different circumferential lengths, if the strips are applied at a constant angle, *it is geometrically impossible for the strips to advantageously adjoin one another at both the equatorial plane and the lateral edges* (e.g. note col. 9, line 15 - col. 10, line 8). Marchini therefore suggests that this geometric problem can be solved by applying the strips in a manner that the strip angle relative to the midplane gradually increases towards the axial extremities of the strips (esp. fig. 5 and col. 11, lines 1+). In view of this teaching and the fact that Ogawa et al., as noted above, suggests achieving the desired inclination angle of the strips by controlling the rotation of the forming drum/core and the lateral displacement speed relative to each other (col. 9, lines 10-14), it would have been obvious to control these speeds relative to one another to yield the desired angle variation taught to be advantageous by Marchini et al., especially when applying to crowned drums.

Thus, while it is not disputed that Marchini uses a different specific application method to actually achieve the desired strip path (including pressing initially at the

center, etc.), the fundamental geometric realities accompanying applying belt strips on a crowned drum, as well as the fundamental solution to this problem (varied angular path as in fig. 5) as taught by Marchini, would have been certainly understood as applicable to any process in which a belt reinforcement is formed by successively applying belt strips to a crowned drum, such as in Ogawa. In other words, the problem identified by Marchini, as well as the solution to this problem, would have been understood as applicable to any process in which a tire belt is formed by successive application of strips to a crowned drum, regardless of the particulars of the specific application process of the strips.

It is then argued that the applied references "do not teach the claimed rotation" because the rotation about axis X-X taught by Marchini is an indexing rotation. Controlled rotation of the drum during application is however suggested by Ogawa. Again, while Marchini chose a different manner to achieve the varying angles, the fundamental geometric teachings thereof would be understood as applicable regardless of how the strips are applied.

With respect to Hitotsuyanagi, it is argued that this reference applies to a cylindrical drum and suggests rotating at a constant rotational velocity rather than continuously varying. Hitotsuyanagi et al. however was not applied for any particular teachings of any particular application path/pattern but rather as evidence that, in this art, in the context of processes that include successively applying rubberized cord material to a drum along a non-linear path and that use an axially traversing feeder and rotatable drum, it is understood to be suitable and effective to achieve the varying

angles by controlling *only the speed of the drum during the traverse of the feed device.* In other words, Hitotsuyanagi teaches the artisan that it is suitable and sufficient, in a similar process/apparatus to Ogawa, to achieve a desired path by only controlling the drum rotation speed. Further, from the suggestion for "gently accelerating and decelerating" the drum, it is apparent that the angle can be varied as desired and it is not simply constant velocity. To control the drum rotation during the traverse of the feed device in Ogawa so as to be at a maximum at the center and smaller towards the edges to achieve the desirable cord path suggested by Marchini on a crowned drum would therefore have been obvious and predictably expected to achieve the homogeneous distribution attributed to this desirable angular path. It is also argued that Hitotsuyanagi applies cords rather than strips and is not directed to achieving edges that properly adjoin. Again, however, Hitotsuyanagi was not applied for any particular teachings of any particular application pattern. Further, and in any event, note also that application of plural cords, seemingly therefore forming a strip, is also contemplated (paragraph [0135]).

In discussing the examiner's comments from the advisory action of July 28, 2008, appellant argues that the examiner continues to misconstrue the teachings of the references and that Marchini would suggest that applying strip as in Ogawa would produce an inferior structure and that thus "it is necessary to use a entirely different method in which relative rotation is brought about between the toroidal support and the reinforcing strip". For reasons detailed above, however, Marchini is not specifically describing the Ogawa process but rather simply a problem that would necessarily afflict

any process where a constant width strip is applied at a constant angle to a crowned drum. The solution to that problem is fundamentally an appreciation that if the strip angle is varied across the width of the belt, then the edges can be aligned (Fig. 5 of Marchini). There is no reason to believe it is necessary to use the particular manner chosen by Marchini to achieve the desired path of the strip - any suitable and effective manner of achieving a varying angular path would have been understood as equally effective.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Geoffrey L. Knable/

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